

LISTING OF THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application:

1.(original) A polynucleotide comprising:

- (a) a region which comprises as operably linked components (i) a promoter which provides for seed preferred expression; and (ii) a nucleotide sequence derived from a bacterium which sequence encodes a carotene desaturase; and (iii) a transcription termination region; and
- (b) a further region which comprises as operably linked components (i) a promoter which provides for seed preferred expression; and (ii) a nucleotide sequence encoding a phytoene synthase which sequence is derived from maize (*Zea sp.*) or rice (*Orzya sp.*); and (iii) a transcription termination region.

2.(original) A polynucleotide according to claim 1 wherein the sequence which encodes the carotene desaturase is derived from *Erwinia sp.*

3.(currently amended) ~~[[A]]The polynucleotide according to claim 1 or claim 2- wherein said promoter is selected from the Glutelin 1 promoter and the Prolamin promoter and said transcription termination region is selected from the group consisting of Nos[;], CaMV 35S and PotP1-II transcription termination regions.~~

4.(currently amended) ~~[[A]]The polynucleotide according to any one of claims 1- to 3~~claim 1 wherein the sequence which encodes carotene desaturase and the sequence which encodes phytoene synthase further comprises a sequence encoding a plastid targeting sequence.

5.(currently amended) ~~[[A]]The polynucleotide according to any one of claims 1- to 4~~claim 1 wherein said region and/or said further region further comprises an intron.

6.(currently amended) [[A]]The polynucleotide according to any one of claims 1 to 5 claim 1 which comprises a sequence selected from the group depicted as SEQ ID NO: 1; 2; 3; 4; and 6consisting of SEQ ID NO: 1, 2, 3, 4, 5, and 6.

7.(currently amended) A polynucleotide sequence which is the complement of one which hybridises to [[a]]the polynucleotide according to claim 6 at a temperature of about 65°C in a solution containing 6 x SSC, 0.01% SDS and 0.25% skimmed milk powder, followed by rinsing at the same temperature in a solution containing 0.2 x SSC and 0.1% SDS wherein said polynucleotide sequence still comprises a region encoding a carotene desaturase and a further region encoding a phytoene synthase and when said polynucleotide sequence is inserted into plant material the seed of a plant regenerated from said material produce an increased amount of carotenoids when compared to a control like-seed.

8.(currently amended) [[A]]The polynucleotide sequence according to claim 7 wherein when said polynucleotide sequence is inserted into plant material, the seed of a plant regenerated from said material produces at least a sixty fold increase in carotenoids when compared to a control like-seed.

9.(currently amended) [[A]]The polynucleotide sequence according to claim 7 wherein when said polynucleotide sequence is inserted into plant material, the seed of a plant regenerated from said material produces at least a three hundred and fifty fold increase in carotenoids when compared to a control like-seed.

10.(currently amended) [[A]]The polynucleotide sequence according to claim 7 wherein when said polynucleotide sequence is inserted into plant material the seed of a plant regenerated from said material produces carotenoids at a level of at least 10 μ g/g of endosperm of said seed.

11.(currently amended) [[A]]The polynucleotide sequence according to claim 7 wherein when said polynucleotide sequence is inserted into plant material the

seed of a plant regenerated from said material produces carotenoids at a level of at least 15µg/g of endosperm of said seed.

12.(currently amended) A polynucleotide sequence which is the complement of one which hybridises to [[a]]the polynucleotide according to claim 6 at a temperature of about 65°C in a solution containing 6 x SSC, 0.01% SDS and 0.25% skimmed milk powder, followed by rinsing at the same temperature in a solution containing 0.2 x SSC and 0.1% SDS wherein said polynucleotide sequence still comprises a region encoding a carotene desaturase and a further region encoding a phytoene synthase and when said polynucleotide sequence is inserted into plant material the seed of a plant regenerated from said material produce carotenoids amounting to at least 80% of the carotenoid content of a seed which comprises a polynucleotide selected from the group ~~depicted as~~ SEQ ID NO: 1; 2; 3; 4; 5 and 6 consisting of SEQ ID NO: 1, 2, 3, 4, 5 and 6.

13.(currently amended) [[A]]The polynucleotide sequence according to claim 12 wherein when said polynucleotide sequence is inserted into plant material the seed of a plant regenerated from said material produces carotenoids amounting to at least 100% of the carotenoid content of a seed which comprises a polynucleotide selected from the group ~~depicted as~~ SEQ ID NO: 1; 2; 3; 4; 5 and 6 consisting of SEQ ID NO: 1, 2, 3, 4, 5 and 6.

14.(currently amended) [[A]]The polynucleotide sequence according to ~~any one of~~ claims 7 to 13~~claim~~ 7 wherein said seed is a rice seed.

15.(currently amended) [[A]]The polynucleotide ~~or a polynucleotide sequence~~ according to ~~any one of~~ claims 1 to 14~~claim~~ 1 which further comprises a region which encodes a selectable marker.

16.(currently amended) [[A]]The polynucleotide ~~or a polynucleotide sequence~~ according to claim 15 wherein said selectable marker comprises a mannose-6-phosphate isomerase gene.

17.(currently amended) [[A]]~~The polynucleotide or a polynucleotide sequence according to any one of claims 1 to 16~~claim 1 which is codon optimised for expression in a particular plant species.

18.(currently amended) [[A]]~~The polynucleotide or a polynucleotide sequence according to claim 17~~ wherein said plant species is rice (*Orzya sp.*).

19.(currently amended) A vector comprising [[a]]~~the polynucleotide or a polynucleotide sequence according to any one of claims 1 to 18~~claim 1.

20.(currently amended) A method for increasing the carotenoid content of seeds comprising inserting into plant material a polynucleotide ~~or a polynucleotide sequence according to any one of claims 1 to 18~~claim 1 or a vector according to ~~claim 19~~; and regenerating a seed-containing plant from said material and identifying the seeds which contain carotenoids at levels greater than those of control like-seeds.

21.(currently amended) A method for increasing the carotenoid content of a seed comprising inserting into plant material a polynucleotide comprising a sequence selected from the group ~~depicted as SEQ ID NO: 1; 2; 3; 4; 5 and 6~~consisting of SEQ ID NO: 1, 2, 3, 4, 5 and 6 and regenerating a seed-containing plant from said material and identifying the seed which contains carotenoids at levels greater than those of a control like-seed.

22.(currently amended) [[A]]~~The method according to claim 20 or claim 21~~ wherein said seed contains at least a sixty fold increase in carotenoids when compared to a control like-seed.

23.(currently amended) [[A]]~~The method according to claim 22~~ wherein said seed contains at least a three hundred and fifty fold increase in carotenoids when compared to control like-seed.

24.(currently amended) [[A]]The method according to claim 20 or claim 21
 wherein said seed contains carotenoids at a level of at least 10µg/g of endosperm
 of said seed.

25.(currently amended) [[A]]The method according to claim 24 wherein said seed
 contains carotenoids at a level of at least 15µg/g of endosperm of said seed.

26.(currently amended) [[A]]The method according to any one of claims 20 to
 25 claim 20 wherein said carotenoids are selected from the group consisting of:
 lycopene[;], alpha-carotene[;], lutein[;], beta-carotene[;], zeaxanthin[;],
 antheraxanthin[;], violaxanthin[;], and neoxanthin; or a combination thereof.

27.(currently amended) A seed obtained by [[a]]the method according to any one
 of claims 20 to 26 claim 20.

28.(currently amended) [[A]]The seed according to claim 27 which is a rice seed.

29.(currently amended) A plant which comprises [[a]]the seed according to claim
 27 or claim 28.

30.(currently amended) A plant or plant material which comprises a polynucleotide
 or a polynucleotide sequence according to any one of claims 1 to 18 or a vector
 according to claim 19 claim 1.

31.(currently amended) [[A]]The plant or plant material according to claim 30
 which is a rice plant or is rice plant material.

32.(currently amended) [[A]]The plant or plant material according to claim 30
 which is a maize plant or is maize plant material.

33.(currently amended) [[A]]The plant according to any one of claims 29 to
 32 claim 29 which further comprises a polynucleotide which provides for a trait
 selected from the group consisting of: insect resistance and/or tolerance[;],

nematode resistance and/or tolerance[[]], herbicide resistance and/or tolerance[[]], improved resistance and/or tolerance to stress[[]], a substance having pharmaceutical activity[[]], and any other desired agronomic trait.

34.-37.(cancelled)